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AUTHOR	Smead, Valerie S.; Chase, Clinton I.
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ABSTRACT

Two issues related to expectation and student achievement were examined in this study of eighth-grade mathematics students: (1) the influence of parental, peer, and self-expectation on student performance; and (2) the influence of cultural expectations, or stereotypes, on student performance. Students were questioned at the beginning of the school year as to their individual achievement expectations and, also, as to their perceptions of parental and peer expectations. Sex role expectancy groups were constructed based upon student sex stereotype expectations in combination with student sex. Teacher expectations were measured by predicting the top and bottom ten achievers in their class. Expectations were contrasted with achievement outcomes measured at mid-year and end-of-year points. Data analysis suggested that: (1) Teacher expectation clearly is not the sole source of influence in student achievement--student expectations may perhaps be more important; (2) A network of expectations operates, consisting of the student, his/her peers and parents, and the teacher; (3) Student expectations, not only for themselves as individuals but for themselves as members of the male or female sex, relate significantly to achievement outcomes and interact with each other in this relationship; (4) In courses traditionally thought of as male areas of superiority, the expectation for male superiority may be translated into differential achievement favoring males, more particularly when the student is at the age of puberty, as were the subjects of this study. (MB)

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THE COMPLEX OF EXPECTATIONS AND STUDENT ACHIEVEMENT

by:

Valerie S. Smead, Ph. D.

Clinton I. Chase, Ph. D.

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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Since the publication of Pygmalion in the Classroom (Rosenthal and Jacobson, 1968) a voluminous number of studies have been carried out in the area of teacher expectations. Fervent enthusiasm turned gradually to scathing critiques, leaving Rosenthal pleading, "Don't bite my finger, look where I am pointing" (Rosenthal, 1972, p. 59). As studies in the area continued, so did negative, contradictory, and confusing results. Yet, amidst the dross, a few studies can be found with the twin virtues of being both well designed and achieving significant results in the predicted direction, (Beez, 1970; Brophy and Good, 1970; Entwistle, Cornell, and Epstein, 1972; Palardy, 1976; and Seaver, 1973). More importantly, a framework for conceptualizing and then investigating the effect is gradually evolving from the steps and missteps of the many studies undertaken in the area.

The project to be reported on was largely exploratory in nature. It highlighted two conceptual issues which have, of late, been given more attention in the literature. Resolution of these issues is necessary to add flesh to the skeletal framework which is currently evolving for investigation of the expectancy effect and essential before successful documentation is secured across individuals and classrooms. The issues addressed were:

1). Though most studies have focused on teacher expectations, the

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teacher is not the only source of expectations in operation in the classroom. Several studies have documented that the student's own expectation can have an impact on their achievement (Mulligan, 1973; Rappaport and Rappaport, 1975; Zanna,Sheras, and Cooper, 1974). Others have speculated that significant others such as parents and peers, though not actually present in the classroom also can influence the student through their expectations (Finn 1972; Entwistle and Cornell and Epstein, 1972).

If this complex of expectations is actually in operation, partial explanation is obtained for the confusing and often non-significant results when only the teacher was the focus of investigation. Provisions were made for exploring this issue by including direct measures of student expectation and indirect measures of parent and peer expectations along with teacher expectation. All variables were predicted to relate to student achievement outcomes.

2). Much evidence is available that expectations, whether teachers' or students' are exceedingly subtle phenomenon which do not operate in parallel fashion across individuals and classrooms (Brophy and Good, 1972; Gardner and Bing, 1973; Rubovits and Maehr, 1973). Results of previous studies suggest that characteristics of both the individuals and the settings involved interact with expectations in a variety of often impossible to predict permutations. One means of circumventing this difficulty has been proposed by Finn (1972). He suggested focusing on expectations arising from strong cultural traditions which interact with a perceived characteristic of the individual. An example of such would be expected performance differences for males and females in academic subjects such as mathematics and English. Guided by this idea, provisions were made for potentiating the expectancy effect by focusing not only on individual achievement expectations, but also on cultural expectations

expectations for male and female achievement. Mathematics class, a traditional bastion for male success, was chosen for investigation.. Attempts to further "load the deck" were made in choosing eighth grade students as subjects. These students were at or near puberty when sex role stereotypes would be expected to be more salient as thoughts turn to consolidation of a sexual identity.

Thus, the power of cultural traditions in making expectations felt across individuals and classrooms was tested. It was predicted that the high achievement expectations of males would be potentiated in this setting. Following similar reasoning, low achievement expectations of females were also predicted to be potentiated.

In order to explore these two conceptual issues long-standing, naturally occurring, student expectations for their individual achievement in mathematics class and for male and famale differential achievement in mathematics were assessed for students in 21 eighth grade mathematics classrooms in three schools in a southern Indiana city. These expectations were measured in October via written self-report (Form II). Student perceptions of parent and peer expectations for their achievement were also measured on this form. An additional expectancy measure (Form I) was administered to teachers at this time to determine their predictions for each student's achievement in mathematics class that year.

The definition of expectancy guiding this study was a consciously held belief about the probably academic success in a particular class that an individual (particular student) or group (males/females) would achieve.

Expectations held by the agent (teacher), the actor (student), and those perceived by the actor (parents and peers) were considered

worthy of investigation.

Instruments

Student individual achievement expectations came from two questions on Form II. "How well do you think you'll do in math class this year?" and "What grade do you think you'll get on your report card?" Students answering with the combination of "Well" and "A" or "B" became the High Individual Expectancy Group. The Low Individual Expectancy Group was composed of those students answering "Okay" or "Badly" with "C", "D", or "F". "C" grades were included in this group because of the overall tendency for students to predict quite high grades for themselves. Those predicting only a "C", were felt to hold fairly low expectations. Two exceptions were made to this scheme. A small number of students predicted "A" or "B" and circled "Okay" or "Badly"; these students were still relegated to the High Expectancy Group. Another small group of students predicted "C", "D" or "F", but circled "Well"; these students were considered Low Expectancy Students.

Two additional questions on the same form measured the students' perception of their parents' expectations for their mathematics achievement asking "How well do you think your parents feel you'll do in math class?" and "What grades do you think your parents would say you'll get in math?". Expectancy groups were determined in the manner described above for student individual achievement expectancies.

Another two questions measured students' perceptions of peer expectations asking, "How well do you think your friends (the kids you hang around with) feel you'll do in math class?" and " If your friends took a vote on what grade they thought you would get in math, which grade would get the most votes?"

Finally, one question measured students' perceptions of sex role stereotyped achievement in mathematics, "Who usually does better in math?" -- "Boys", "Girls", or "Neither"; sex role expectancy groups were based on answers to this question in combination with student sex.

Teacher expectations were measured on Form I, by asking them to list the individuals they predicted to be the top 10 and bottom 10 mathematics students in their classes. These became the High and Low Teacher Expectancy students. Teachers were given complete latitude in making these predictions; they were instructed that it did not matter how they were made, "gut level feeling, previous grades, etc". Those students not listed became the Middle Teacher Expectancy students.

Dependent Measures

Expectations captured in October were contrasted with student achievemetn outcomes in December as measured on the Iowa Test of Basic Skills (iTBS) and in April as measured on an Experimenter Compiled Mathematics Text (ECMT).

The ECMT was based on a series of items designed specifically for eighth grade mathematics students in Indiana by the State Department of Public Instruction (Division of Compensatory Instruction). These items developed by a team of five mathematics specialists and two psychologists, had recently been administered to two sample populations within the state and revised for the Title I Program.

The reliability obtained after administration of this test to 403 students initially included on this measure was Kuder Richardson, .83, standard error of measurement 2.57, and Spearman-Brown, .86, standard error

of measurement 2.34. The mean score was 17.80 with a standard deviation of 6.3.

Data Analysis

The RCC5V program for factorial designs with unequal cell frequencies (1970), a modified version of the BMD05V general linear hypothesis model, was used for computer analysis. Two designs were investigated. The first allowed for testing teacher and student expectations, both for students individual achievement and sex role stereotyped achievement. Blocking was based on 1) High and Low Individual Expectation of the students; 2) Statements that Males were Better Mathematics Students, Females Better, and Neither Better; 3) Student Sex; and 4) Teacher High and Low Expectations for individual students' achievement.

The second design was directed toward investigation of the effect of student perception of parent and peer expectations for their individual achievement. Blocking was based on 1) High and Low Individual Expectation of the students'; 2) Both Parents and Peers Agreeing with student expectations, and Neither Agreeing with student expectations; 3) Student Sex; and 4) Teacher High and Low Expectations for individual students' achievement.

Each design was run twice utilizing the Total Math Score grade equivalent obtained on the ITBS given in December, and the total score on the ECMT given in April, respectively.

Results

Generally, predictions made concerning the complex of expectations were supported. Student expectations for their individual achievement in mathematics related significantly ($p < .001$) to their achievement outcomes in December on the ITBS and in April on the ECMT. Student perceptions of parent and peer expectations also achieved a significant

relationship ($p < .05$) with achievement outcomes across dependent measures and times of the year. This relationship was of an interactional nature such that high expectancy students with agreeing parents and peers outperformed low expectancy students with agreeing parents and peers. Teacher expectations did not achieve significance as a main effect. The gross measures utilized, looking at top, middle and bottom thirds of the students in terms of teacher expectation could, quite possibly, have prevented the effect from appearing. The teacher's expectancy did appear as a variable in several significant, but hard to interprete interactions.

Predictions made on the issue of cultural traditions for sex role stereotyped performance were generally upheld on Design I only when the ITBS was used as a dependent measure. No significant differences were obtained on the ECMT. The significant interactions obtained were generally in the direction of males benefiting from the cultural stereotype and females being hampered, as predicted. More specifically, only one sex role stereotype had a significant effect, the belief that boys were better mathematics students correlated with improved achievement outcomes for boys and depressed outcomes for girls ($p < .05$). The competing belief, that girls were better mathematics students, did not have a similar potentiating effect on female performance. Additionally, low individual achievement expectancy girls, who demonstrated significantly lower achievement outcomes than the other contrast groups ($p < .01$) managed to go significantly lower when they reported the belief that boys were better mathematics students ($p < .05$).

In sum, student individual achievement expectancy and student sex role stereotyped expectations (in the instances where the traditional stereotype for superior male achievement was held) related significantly to differential achievement outcomes. Parents and peers, perceived as

agreeing with student expectations for themselves further potentiated the effect, leading to significant relationships with student achievement outcomes. And, in the case of low expectancy girls, the effect achieved its most pronounced relationship in the direction of lowest achievement outcomes of any group.

Extensive generalizations based on correlational data such as this are perhaps unjustified. However, several statements can be made which lend promise for significant research in several directions.

1). Teacher expectation clearly is not the sole source of influence in the expectancy drama. Student expectations hold a place, perhaps a more important place, as well.

2). A "network of expectations" (Finn, 1972), indeed, appears to operate. Members of this network identified here are the student, his/her parents and peers, and the teacher.

3). Student expectations not only for themselves as individuals but for themselves as members of the male or female sex relate significantly to achievement outcomes and interact with each other in this relationship.

4). In courses traditionally thought of as male areas of superiority, the expectation for male superiority may be translated into differential achievement favoring males. Puberty may be a time when such stereotypes are particularly devastating.

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